

INDIANA HISTORICAL SOCIETY PUBLICATIONS

VOLUME I

NUMBER VIII

ARCHÆOLOGY

BY

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(Delivered before the Society, February 14, 1877)

INDIANAPOLIS
THE BOWEN-MERRILL COMPANY

1897

(215)

ARCHÆOLOGY.

Gentlemen of the State Historical Society of Indiana:

No department of natural history is, at this time, receiving more attention from the votaries of science and thoughtful readers than that which pertains to man and his antiquities. Indeed, so familiar are its students with the present status of anthropology that it will be difficult for me to present novel facts in research or new channels of thought worthy of the attention of a body of such able co-laborers. I crave your indulgence, therefore, if some parts of my address should prove to be devoid of special interest.

Matter and life are universal. The solar system, as well as all other heavenly bodies, is the result of simple substances aggregated into compound substances. These complex bodies forming the universe are produced by the affinity or affection which certain elementary and compound substances have for each other, and the process of evolution in the mineral kingdom, as well as in the organic world, is in constant operation.

Organized matter, or life, results from the combination of the fewest number of simple substances, namely: Carbon, hydrogen, oxygen and nitrogen. These four elements constitute the chief part of all organized tissues. Woody fiber, sugar, starch, gum, fat, oils and many organic acids contain only three—carbon, hydrogen and oxygen—yet I must not omit to mention that in organized matter a small per cent. of

other elements is found, such as phosphorus, sulphur, calcium, potassium, sodium, magnesium, silicon, and some others, but the chief mass of plants and animals are formed of the four elements first mentioned. The fourteen or fifteen elements which constitute the principal mass of the mineral world are almost the same which occur in organized matter, the difference being chiefly this: That in inorganic nature the predominant elements, nearly in the order of their abundance, are oxygen, hydrogen, nitrogen, silicon, chlorine, sodium, aluminum, carbon and iron, after which follow potassium, calcium, magnesium, sulphur, phosphorus, iodine and fluorine, while in the organic departments the order is nearly as follows—carbon, hydrogen, nitrogen, potassium, calcium, phosphorus, silicon, sulphur, sodium, magnesium, chlorine, iron, iodine and fluorine.

From this it will be apparent that no essential distinction can be made between inorganic and organic bodies founded on the nature of the elements concerned in their production.

Since spectrum analysis has revealed the presence of these elementary substances, common to organized bodies, in the stars, sun and all of its dependent planets, how can we doubt the existence of life in some form throughout the universe. The heavenly bodies which come to us in the shape of meteorites are in many instances found to contain graphite, a form of carbon most likely due to the destruction of organized matter in some form or other.

The law of change pervades all nature, and there appears to be no such thing as stability. The solid crust of our globe and the life evolved upon it when passed in review before the eye of the earnest student of nature presents an ever-changing panorama from old to new forms of life, and though we are not able to assign specific dates in the history of progress from the lowest forms to the earliest traces of man, geology

has pointed out the way by which relative records may be established.

If we dig down into the earth beneath our feet, we find that it is composed of layers of many kinds of stone, resting upon unstratified crystalline rocks—the so-called archæan rocks, which form, as it were, the backbone of the earth. The superstructure of stratified rocks were formed by the destruction of older rocks, and once lay at the bottom of the ocean in the condition of mud or ooze. The sedimentary rocks, so formed, are of very great thickness, since we are able to deduce not less than ten miles by measuring from the top of mountain peaks to the bottom of deep sea soundings, while the aggregate thickness of the earth's crust within the reach of the geologist may be set down as twice this amount.

A close study of this crust, composed of stratum upon stratum that enfold the earth like so many successive rings of growth, reveals a most wonderful history, for they are largely made up of the petrified skeletons of the denizens of an ancient ocean. The bottom layers were necessarily formed first, and are therefore the oldest in time; they likewise contain old forms of life, most of which have long since been lost to the world—so that, step by step, as we ascend in the series, new types of life are met with, and by successive epochs we finally pass through eozoic or dawn of life, palæozoic or ancient life, mesozoic or middle life, to cenozoic or recent life. These are simply great divisions of the earth's stony crust, like dividing a column into lower, middle and upper parts, and will serve our present purposes of pointing out the vast time required for the accumulation of such a mass of sedimentary matter, and the long endurance of life, in one form or another, on the globe.

Lyell, in his *Principles of Geology*, has undertaken to furnish datum for ascertaining, approximately, the length of time required to form a given amount of strata, by measuring the

quantity of sediment annually brought down by the Mississippi river and deposited in the area of 12,300 square miles comprising the delta. "Borings near New Orleans have gone to the depth of 600 feet in these fluviatile deposits, and the average depth was assumed to be 528 feet, or the tenth of a mile. The quantity of solid matter brought down annually by the river is given at 3,702,758,400 cubic feet, and the accumulations of the whole deposit must have taken 67,000 years." Yet this deposit made by the Mississippi river represents but a mere fraction of geological history, and belongs to the Quaternary or modern epoch. It will serve, however, to prepare your minds for the reception of a chronology which, though we can not fix the exact date of the beginning, is absolutely demanded at the very threshold of the earth's history.

In tracing the history of mankind, back or down the stream of time, various systems of classification have been proposed, having for their object the division of the subject into distinct periods.

Sir John Lubbock recommends a division of prehistoric archæology into four great epochs:

1. Palæolithic (ancient stone period), that of the Drift, when man shared the possession of Europe with the cave bear, the woolly haired rhinoceros and other extinct animals.
2. Neolithic (polished stone age), a period characterized by beautiful weapons and instruments made of flint and other kinds of stone, but without a trace of any knowledge of metals except gold, which appears to have been used sometimes for ornaments.
3. Bronze Age, in which bronze was made for arms and cutting instruments of all kinds.
4. Iron Age, in which that metal had superseded bronze for arms, axes, knives, etc.; bronze, however, still being in

common use for ornaments and frequently for the handles of swords and other arms, though never for blades.*

These divisions are more strictly applicable to European archæology than to that of America, for during pre-columbian times man on this continent had not advanced beyond the second or neolithic age.

There can be no doubt that primitive man was a cannibal, scarcely more elevated, in a moral sense, than the beasts which surrounded him, and he was long devoid of a knowledge of all but the simplest forms of art, and was taught by necessity to clutch a stick or unwrought stone as implements of defense or offense, or with which to crush roots or crack nuts for food.

Indeed, this was the condition of the inhabitants of Australia when that continent was first discovered by Europeans. While, therefore, we may justly regard these four ages as natural steps through and by which mankind have progressed from the simplest to the present grand achievements of art, yet the fact can not be overlooked that this progress was not uniform over the entire globe, and that from the present civilization of Europe and the United States we may point to vast regions of country peopled by native races in the lowest state of savagery, "people who have not conceived the art of fashioning a stone or shaping a bow."

In digging up the bottoms of many of the caves which abound in France, Belgium and Spain, the remains of man, associated with the bones of extinct animals, flint flakes, arrow points and stone knives, have from time to time been found. In some instances these remains were found buried beneath a solid floor of stalagmite of very great thickness, and covered up by many feet of cave-earth (red-ferruginous

* "Prehistoric Times." Sir John Lubbock.

clay), which is again overlaid by another stalagmitic floor and cave-earth.

Dr. Charles C. Abbott, of Trenton, New Jersey, has, for some years past, been finding large numbers of palæolithic implements in the glacial drift which forms the lower terrace of the valley on the north side of the Delaware river. The deposit is twenty to thirty feet above the freshets of the river, and extends beneath the bed of the stream. It is composed of large boulders, pebbles and sand, many of which are from archæan beds which lie beyond the borders of the state. Though unable to find here any traces of glacial striation on the boulders or pebbles, Dr. Abbott considers the deposit similar to the drift seen in other parts of the state, where striation and grooves are prevalent, and clearly point to glacial origin. The implements are, from their form, called "turtle-back" celts.

Prof. F. W. Putnam also visited the locality where these implements are found, and informed me that he saw numbers of the "turtle-back" celts sticking out of the drift, where they are exposed by cutting away several feet from the face of the cliff, going to prove that they were not brought from near the surface by the sliding of the bank.

Prof. N. S. Shaler, state geologist of Kentucky, subsequently visited the locality, and while corroborating the testimony of Dr. Abbott and Prof. Putnam that the implements were in place, could not satisfy his mind that the rounded pebbles and boulders belonged to the glacial epoch. This very important discovery of human implements in the drift deposits of New Jersey, by Dr. Abbott, tends to strengthen the evidence in regard to finding a human skull in the glacial deposits of California.

Though there are highly probable accounts of finding the remains of man in the Pliocene deposits of America and Europe, the evidence is not clearly such as will satisfy the strict-

est demands of science. We may, therefore, look upon the cave-dwellers, who were contemporaries of the extinct elephant, woolly-haired rhinoceros, hippopotamus, cave-bear, etc., as the most ancient man, and they antedate the dog and other domestic animals.

The cave-dwellers were probably followed by the mound-builders and the constructors of earth and stone circles; and if, at any period, universal man exhibited but one status, it might justly be claimed for the mound builders' age—tumuli, or mounds, being in Egypt, Turkey, Arabia, India, China, Germany, England; indeed, in all countries of Europe, North and South America. Stone circles are reported even in Australia, where the lowest type of man is found, and they are also seen in Japan.

Mr. Shuze Isawa, a native of Japan, who read a paper on the origin of the Japanese people at the Nashville meeting of the A. A. A. S., informed me that the Japanese always built a mound when an emperor died. Mr. Isawa stated in his paper that the Japanese people came from India, and found the island inhabited by a race of savages. These savages were driven to the north part of the island, where a remnant of the race are still to be found.

Notwithstanding this universality of tumuli and stone and earth circles, I think we may justly claim North America as preëminently the home of the mound-builder. Here his works are seen in greatest numbers, and culminated in the (so to speak) perfection of his humble but laborious style of architecture, when we consider the simple tools with which the work was accomplished. The step of progress in art, from the cave men to the mound-builders, prevailed only with a branch or offshoot from the primitive stock of men. So it is with regard to all other races who show a decided progress in civilization and arts up to the present time. They are the results of so many developed branches, while the primitive

racés are still in the lower stages of savagery and barbarism with brains as incapable of ratiocination as their congeners of remote ages. In this stage they will continue until exterminated by the spread of civilization, with which they are unable to cope. In the white race we find the perfection of anatomical and physiological development, and a brain that exceeds that of all other races of men in its size and weight, and immeasurably superior to them in its refined powers of thought. By whatever means we may strive to elevate the Turanian races, and however apt they may be in accumulating ideas and expressing thought, a limit is soon reached, and no amount of training will suffice to surmount the barriers to progress interposed by physiological inabilities. Each race in its respective sphere may continue to achieve triumphs in progressive arts, and grow more and more perfect in knowledge, yet each has its limit, and that limit is determined by organization.

In the prosecution of our investigations of the antiquities of pre-historic man, it is not inappropriate to take a look at the condition and differences which are apparent in his living representatives of to-day.

Ethnologists and naturalists divide mankind into a number of distinct races. Cuvier makes but three, Pritchard seven, Agassiz eight, Pickering has as many as eleven, but the most commonly received classification is that of Blumenbach, who makes five. First is the Caucasian, or white race, including the greater part of the European nations and western Asia; Mongolian, or yellow race, occupying Tartary, China, Japan and India; Ethiopian, or negro race, occupying all Africa south of the Sahara; American, or red race, embracing the Indians of North and South America; Malayan, or brown race, inhabiting the islands of the Indian archipelago and Australia.

There is such a blending of characteristics in some of the

lower races that it is by no means easy to establish a boundary line between them, and hence the diversity of opinion in the classification.

Prof. Huxley, with that clearness of thought and profound research that characterizes all his labors, in a paper read before the International Congress of Pre-historic Archæology, which assembled in England in 1868, divides the human family into four races, and I take the liberty of reproducing entire what refers to this point. He says: "By races I mean simply the great distinguishable groups of mankind—such groups as a naturalist would form if all mankind were put before him to be sorted according to their physical likenesses and unlikenesses. And by distinct races I mean those which do not grade into one another, except under such circumstances as make it certain, or at any rate highly probable, that inter-breeding has taken place. The number of races in this sense appears to me to be small; indeed, I do not see my way to the recognition of more than four, which I shall call Australioid, Negroid, Mongoloid and Xanthochroic races.

"The characteristics of the Australioid are: A dark complexion, ranging through various shades of light and dark chocolate color; dark or black eyes; the hair of the scalp black, neither coarse and lank, nor crisp and woolly, but soft, silky and wavy; the skull always belonging to the dolichocephalic group, or having a cephalic index of less than 0.8.

"Under the head of Negroid race are included those people who have dark skins ranging from yellowish brown to what is usually called black; dark or black eyes; dark or black hair, which is crisp, or what is usually called woolly in texture; with very rare exceptions these people are dolichocephalic.

"In the Mongolian race the complexion ranges from brownish yellow to olive; the eyes are dark, usually black; the

hair of the scalp black, long, coarse and straight; that of the body remarkably scanty; the proportions of the skull, so constant in the two preceding races, vary in this from extreme dolichocephalic to extreme brachycephalic.

“Finally, in the Xanthochroic race the complexion is very fair; the eyes are blue or gray; the hair yellow or yellowish-brown. In this race again the skull ranges through the whole scale of its varieties of proportion from extreme breadth to extreme length.”

All other forms of mankind he considers lie between some two of these primary stocks.

“The Australioids include only the inhabitants of Australia, and are not found in any of the neighboring islands. But, in the Dekkan, which is bounded on the north by the valley of the Ganges, Indus and Himalaya mountains, and on the east and west by the sea, there is a people—the coolies of East India—which, though they have undergone considerable change by intermixture with an invading arianised population, are, he thinks, clearly referable to the Australioids. While the inhabitants of Moluccas and the Andaman islands are not considered sufficiently distinct to form a separate race from the true negro who inhabits Africa south of the Sahara, he has applied to them the name of Negritos.

“The Mongolians have their most prominent home in central Asia, and extend from thence to Lapland and the Arctic Circle on the northwest and north; to North Hindostan on the south to the Malay archipelago on the east; on the east to China and thence over the whole of the Pacific islands (except those occupied by Negritos), in the extreme northeast to America, and then through its whole length and breadth.

“The Xanthochroi inhabit a much smaller area of the earth’s surface than the Mongoloids. Their center being in central Europe, whence they extend into Scandinavia and the British islands on the northwest. They extended their wander-

ings over the great plains of northern Asia to the frontier of China, and are traceable southward into Syria, and in a fragmentary fashion through northern Africa to the islands of the western coast, while eastward they occur as far as northern Hindostan."*

The manner in which these races dispersed themselves from specific centers to their present habitats, is a matter of very great interest. It is generally believed that the Mongoloid, or Indians of America, came from Asia by way of the Aleutian islands, but it is far more difficult to understand how the Australioid people found their way to the Dekkan, and the negroes to the islands of Polynesia, that are separated by "broad and stormy seas, when their only known means of navigation was a rude raft."

Mr. A. R. Wallace, president of the biological section of the British association, in his address at the Glasgow meeting in September, 1877, among other points of interest bearing on the subject before us, says that "while all modern writers admit the great antiquity of man, most of them maintain the very recent development of his intellect, and will hardly contemplate the possibility of men equal in mental capacity to ourselves having existed in pre-historic times." The weakness of this argument, he says, has been shown by Mr. Albert Mott, in his "very original but little known presidential address to the Literary and Philosophical Society of Liverpool, in 1873," in which he maintains that "our most distant glimpses of the past are still of a world peopled as now with men both civilized and savage," and "that we have often entirely missed the past by supposing that the outward signs of civilization must always be the same, and must be such as are found among ourselves." In support of these views Mr. Mott, as quoted by Mr. Wallace, calls attention to the exist-

* Report International Congress Pre-historic Archæology, 1868.

ence of gigantic stone images, now mostly in ruins, often thirty or forty feet high, and formed of stone, some of which must weigh over one hundred tons. The Easter islands, he says, on which these images are seen, are more than two thousand miles from South America and two thousand miles from Marquesas and more than one thousand from the Gambier islands. It has only an area of thirty square miles. The existence of such works, Mr. Mott says, "implies a large population, abundance of food and an established government," and to maintain all of which, he thinks, necessarily implies the power of regular communication with larger islands or continents, the arts of navigation, and a civilization much higher than now exists in any part of the Pacific." Very similar remains in other islands scattered widely over the Pacific, Wallace says, adds weight to this argument.

While there is little room to doubt, as I have already stated, the existence of various stages of civilization in pre-historic times, yet we must admit that if the Pacific islanders ever possessed the art of navigating broad seas and carrying on commerce from island to island, or with the continents, they must have lost it before losing the art of fashioning the soft coral rock into images, since Capt. Cook mentions that on some of the islands these images were being constructed at the time of his visit, and the canoe constituted their only means of ocean trade. But it may be well to state here, that it is very singular, in his special mention of Mr. Mott's lecture, Mr. Wallace overlooked the fact that Mr. J. H. Lampry read a paper, in 1868, before the British meeting of the Pre-historic Congress of Archæology, in which he calls attention to the antiquities in the Easter and other South Sea islands as a proof that "in ancient times these seas may have been traversed in all directions by a race of men of high intelligence, great physical endurance, capable of patient toil in the accomplishment of great works, whose scant remains,

simple as they are in form, are not destitute of that mystic rhythm in arrangement which at once entitles them to a place in the records of pre-historic times."

In answer to Mr. Wallace, I desire simply to call your attention to the fact that ethnological authorities seem now disposed to agree that the aborigines of America belong to the Mongoloid race without admixture of other races. Admitting, then, that the latter conclusion is perfectly tenable, how does it happen that the builders of stone images, upon stone terraces, in the Polynesian islands, by a people who are of the Negrito type, if possessed of a superior knowledge of arts and skill in navigation, failed to leave the impress of their race upon the American continent? It is a little singular, also, that while Terra del Fuego and Patagonia are inhabited by man, the large islands of the Falkland group, off their coast, were uninhabited; so with the Galapagos, under the equator, while numbers of inhabited islands in the Pacific are less favorable for man's support. I do not believe that man has been degraded from a higher knowledge of art to a lower, nor do I believe that his dispersion over the Pacific Islands and the American continent can be explained by a passage from Asia to America by the aid of the Aleutian chain of islands alone, but by a much broader and more extended area of land which in pre-historic times connected the two continents. For the existence of such a connection we need not, from a geological point of view, go farther back than the glacial epoch, when, in order to spread over North America a glacial sheet of ice reaching as far south as 37° of latitude required an elevation of the region to the north that would lay bare vast areas of land now covered by the waters of the Pacific ocean. And it is to geological changes in the physical geography of the earth that we must mainly look, as a cause, for the distribution of pre-historic men. The time required to swell the population of America from a few pairs of voluntary or in-

voluntary voyagers to its aboriginal magnitude could scarcely be less than that required by the intervention of geographical changes.

In evidence of the slow rate of increase among savage tribes I may cite the accounts furnished by the Jesuit fathers who settled among the Indians of the Pacific coast soon after its discovery by the whites, for the purpose of converting them to Christianity and instructing them in agriculture and other industrial pursuits. They state that debauchery, tribal wars and exposure of infants, through neglect of the mothers, are fast decimating the race.*

In regard to the character of the works left by pre-historic man, whether in Europe or America, after a careful study of what has been written on the subject, and making due allowance for the inaccuracies of detail woven into many of the accounts from hearsay traditions of the savages, I have failed to see in the antiquities any evidence of a higher order of intellect or mechanical skill than is to be found in the tribes now living. The massive structures, of which the ruins are now only to be seen in New Mexico, Arizona, and other portions of the Rocky Mountain region, Mexico, Central America and Peru, while impressive in size and remarkable for the amount of labor required for their completion, do not surpass or equal for comfort and the moral development of the people the present adobe houses to be found in some of the existing Pueblo tribes of North America.

In studying the ancient Pueblos, we must discard as totally worthless the grossly false and mythical histories published of the conquest of Mexico by Cortez, Bernal Diaz, the anonymous conqueror, and other Spanish writers. They were subject to revision by the seven ecclesiastical censors of Spain, and made to glorify the church and to magnify the importance

* Smithsonian Contributions to Knowledge.

of the empire vanquished by the basest treachery and cold-blooded massacres; yet these so-called histories have been copied and quoted from by subsequent historians, eminent as scholars, without questioning their inaccuracies.

We are indebted to Robert Anderson Wilson, author of the "Conquest of Mexico," for a complete refutation of these authors, based upon a careful study of the subject and a survey of the field of Cortez's exploits. Instead, therefore, of seeing in the Aztecs a people highly advanced in the art of government and surrounded with luxuries, indicative of refinement, we must look upon them as they really were, naked savages, and in no way differing from the Pueblo, or town Indians, of the present day.

In this state the antiquities we have to deal with are, so far as at present known, earth mounds, stone mounds, earth wall enclosures and stone wall enclosures. These remarkable monuments of an extinct people may be traced from Texas to Florida, scattered along the shores of the Gulf of Mexico, and extending along the Atlantic coast as far north as South Carolina, and from the mouth of the Mississippi river almost to its headwaters, and following up all its tributaries, and their innumerable branches, to the southern shores of the great lakes. Indeed, so abundant are these antiquities that many have been led to believe that the people who constructed them were at one time the most numerous of all the inhabitants of America. Neither history nor trustworthy tradition can furnish any account of these antiquities, and all efforts, therefore, to define the uses to which they were put, beyond the fact substantiated by exploration, that some of the mounds were used as sepulchers for the dead, is, in my opinion, sheer guesswork. From the fact that these antiquities are never found except along the sea shore, water-courses, or by the side of lakes or living springs of water that are not far from a stream, and that the sites which were selected for them have, in many

cases, proved the most eligible locations for modern towns and cities, we may reasonably infer that the builders cultivated the alluvial river bottoms and depended mainly on vegetables, fish and mollusks, for their food. The mounds vary in height from three feet and less, to sixty feet and more, and from a few feet in diameter to several hundred feet.

In shape they are circular, oval and square; some are conical, others truncated, and a few are reported to have winding stairways leading to their summits. The great mound at Grave creek, West Virginia, is said to be seventy feet high, and one thousand feet in circumference at the base. At Miamisburg, Ohio, there is a mound, reported by Squier and Davis to be sixty-eight feet high and eight hundred and fifty-two feet in circumference at the base. The Cahokia truncated mound, in Illinois, is, by the same authority, 700 feet long, 500 feet wide and 90 feet high.

The highest mounds yet found in Indiana are in Knox county. Prof. Collett, in his report on this county, says the "Pyramid mound, one mile south of Vincennes, is 47 feet high, greatest diameter 300 feet, lesser diameter 150 feet; the level area on the top is 15 by 50 feet, and is crowded with intrusive burials of a later race." Sugar Loaf mound just east of the city limits, was opened up by a shaft which, he thinks, reached the bottom at forty-two feet after passing through:

	Ft.	In.
Loess sand.....	10	00
Ashes, charcoal and bones.....		10
Loess sand.....	17	00
Ashes, charcoal and bones.....		10
Loess sand.....	9	00
Ashes, charcoal and bones.....	2	00
Red altar-clays, burned.....	3	00
	<hr/>	
Total.....	42	8

The mound E. N. E. of Vincennes court-house is built on

a spur of the hills, and the top is sixty-seven feet above the plain. Mr. Collett calls it a "terraced mound," which has a winding roadway to the top. Archæologists have, as I think, without due consideration, classified the mounds into altar and sacrificial mounds, sepulchral or burial mounds, lookout mounds and mounds of habitation.

When we dig into a mound and find that it contains human bones, it may then with propriety be called a sepulchral or a burial mound. But to speak of others as altar mounds or mounds of worship, mounds of habitation or lookout mounds, is assigning to them a purpose which can not be sustained unless fortified by some better proof than the mythical writings of Spanish historians.

It is a common occurrence to find in mounds some ashes and charcoal mixed with human bones, and for this reason the builders have been accused of cremating their dead. So far I have not been able to find any charred human bones, though charred wood and charcoal are of common occurrence. A few fragments of charred bones are reported by Squier and Davis in their so-called sacrificial mounds at Mound City, Ohio. My own opinion is that mounds were simply erected as burial places for the bones of dead chiefs or other persons high in authority. The bones were sprinkled over with ashes and finally with earth. Where ashes and charcoal are found in mounds, but no bones, it is possible that the latter disappeared from decay. Charcoal, as is well known, is the most durable of all known substances. Associated with human bones are sometimes seen flint flakes, arrow and spear points, stone axes, knives, pipes, pottery, etc. The practice of burying with the dead, flints, gravel and ashes, prevailed in Europe to a comparatively modern time. It is an old usage, hence "ashes to ashes, dust to dust."

Shakespeare alludes to this custom in the play of Hamlet,

in the scene where the priest who had charge of the burial of Ophelia is made to say, in reply to Laertes :

“ Her obsequies have been so far enlarged
 As we have warranty: Her death was doubtful;
 And but that great command o’ersways the order,
 She should in ground unsanctified have lodged
 Till the last trumpet; for charitable prayers,
 Shards, flints and pebbles should be thrown on her,
 Yet here she is allowed her virgin crants,
 Her maiden strewments, and the bringing home
 Of bell and burial.”

In Wisconsin there are a large number of mounds built to imitate the shape of various kinds of animals, not omitting man. These mounds contain ashes and the remains of human skeletons, with copper and carved stone trinkets, pottery, etc. In the latter respect they do not differ from the conical, square and truncated mounds of other localities.

The romance which has been thrown around the so-called *Teocalli*, or temple-mounds of Mexico, by the Spanish historians of the conquest, and so inconsiderately adopted by American archæologists, vanishes when put to the crucial test by accurate observations.

Torquamana, who examined the celebrated Mexican temple-mound of Cholula, says: “It still remains without any steps by which to ascend, or any facing of stone. It appears now like a mound covered with grass and shrubs, and possibly it was never anything more.”

Mr. Robert A. Wilson also visited this mound before writing his history of the “Conquest of Mexico,” and corroborates the statement of Torquamana, and he is further satisfied, from the general appearance, that it is of common origin with similar mounds scattered through the country.

Associated with the mounds we have earth wall and stone wall enclosures—some are perfect circles, some square, some ovoid, and still a large number that are anomalous in design.

The height of the walls varies from a foot or two to ten feet or more. Most generally they are accompanied by a fosse, or ditch, which is placed on the inside, rarely on the outside of the wall. In area these works include from a few square feet to upwards of one hundred acres. Like the mounds, they are built on river terraces or high table-lands bordering streams.

The uses for which they were designed by the builders are, in most cases, to say the least, beyond the discernment of careful students of antiquities; and opinions on the subject are almost as numerous as the observers themselves. Where the walls are built around the brow of a high point of land with a level area on top, and is not commanded by the surrounding high-lands, as the "stone fort" at the mouth of Fourteen-mile creek, in Clark county, figured and described in the Indiana Geological Report, 1873, we may reasonably infer that the wall was built as a means of security against intruders upon their privacy or as a defense against warlike foes. The small circular enclosures are generally looked upon as being subservient to some religious ceremonies, I should rather say, superstitious weight, in commemoration of human prowess.

One of the most eminent of American archæologists—Dr. Lewis C. Morgan, of Rochester, N. Y.—in the July number of the *North American Review*, 1876, entertains the opinion, in an ably written article, that the earth walls served as the foundation upon which to construct dwellings. The article is accompanied by figures to show the manner of house that might be adapted to the walls, and the facility with which it could be built by inclining poles of wood against the sides and securing them at the top. The house is divided into a number of rooms to suit their communal customs. These rooms are occupied by separate families. A place for the fire is arranged at intervals in a hall which runs the entire

length, so as to accommodate the necessities of four compartments. In answer to this very plausible theory of my learned friend—Dr. Morgan—I wish to say that if his views are correct we should be able to find at intervals on the embankments, ashes and charcoal and other refuse kitchen matter, but, so far as I know, this has never been done.*

What is now demanded of the archæologist is a more careful study of these mounds and enclosures; maps should be made of the grounds, and sections given which accurately delineate the order of arrangement of the internal structure of the works, and a careful record given of the position occupied by the relics which they may contain. We should by all means discourage, and turn a deaf ear to the relation of, ingenious traditions gleaned from unworthy sources, or wormed from the aborigines by leading questions, and concluded in too many cases by affixing imaginary answers. I repeat that the problem of the condition of pre-historic man can alone be satisfactorily solved by a study of his remains and the works he has left behind him.

With regard to the cranial differences in the races of men, I wish to call your attention to a paper read by Dr. T. O. Summers, Jr., at the late meeting of the A. A. A. of Sci., in Nashville, wherein he pointed out that there is a constant relation existing between the length of the spheno-parietal suture and the capacity of the brain case, determining the brachycephalic or the dolichocephalic character of the skull. Dr.

* Since writing the above I have had an opportunity to visit a Pima Indian village in Arizona. The houses are usually made of bows stuck into the earth and the tops are bent over and tied, giving the dwelling the shape of a bird cage. A wall of earth, one to two feet high, is thrown up around the base on the outside. I saw many of these earth rings where the brush had been taken away, and they have exactly the appearance of the small circular enclosures seen in this and adjoining states, but there was no ditch on the inside. They were simply thrown up to keep out the wind and water.

Summers has had the rare opportunity of examining the large collections of skulls in the various cities of Europe, and has also a large collection of his own, and by the aid of this important discovery unhesitatingly declares that he could at once separate from one another the skulls of white men, negroes and mulattoes.

The ethnologist has long felt the want of more certain rules for the classification of crania than that afforded by a mere measurement of capacity, dolichocephalic and brachycephalic, and I believe that this discovery of Dr. Summers will, if not infallible, prove to be at least of very great assistance in accomplishing so desirable an object, since it is by a study of the osteology of man that we must look for a true classification and a solution of his capabilities.

Archæologists are now fully aware that the neolithic implements and pottery of the mounds are in no way distinguishable from those made by the aborigines from pre-columbian to the present time, and as a means of classification they must totally fail. My distinguished friend, Dr. Lewis H. Morgan, in his recent and very able work called "Ancient America," has given a division and classification of ethnical periods that indicates a thorough acquaintance with the subject, and his book should be in the hands of every student of ethnology. No man in America has done more than Dr. Morgan to systematize and make known the true status of the aborigines, and I take pleasure in thus publicly acknowledging my obligations to him for so valuable a contribution to our knowledge.

In conclusion I desire to call your attention to the care which must be exercised in reaching conclusions on the examination of objects which come under the notice of collectors.

George Rapp, who was at the head of a community of Germans known as "Harmonists," that came to this state in

1815, and settled on the Wabash river, in Posey county, where they built the town of New Harmony, found at St. Louis a large stone slab, eight feet long, five feet wide and eight inches thick, upon which are seen the images of two human feet; in front of these images is an irregularly rounded mark; the feet have the appearance of being the impress made on mud, and the scroll as having been made with a stick in the hands of the owner, and the mud so impressed subsequently hardened into stone.

This foot-print slab was held in high esteem by Rapp, and he played upon the superstitions of his followers by stating that they were left by the angel Gabriel, who alighted on the earth to warn the people of the near destruction of the world. It must be remembered that the Rappites or Harmonists were Second Adventists.

Schoolcraft, in his journey down the Wabash, in 1821, stopped at New Harmony, and gives an account of this foot-print slab, accompanied with accurate drawings. In this account he expresses the opinion that the impressions were those made by an Indian who stepped out of his canoe on a mud beach and made the mark in front of the tracks with a stick and then stepped back into his canoe; subsequently the mud hardened into stone, which preserved the fossil imprints.

Mantell, one of the ablest and most fascinating writers on geology, saw this account of the foot-print slab, and transferred it to his "Wonders of Geology," Vol. 1, p. 75, American edition from third London edition, in the following language:

"Impressions of Human Feet in Sandstone.—In connection with the occurrence of human bones in limestone, I will here notice a discovery of the highest interest, but which has not as yet excited among scientific observers the attention which its importance demands. I allude to the fact announced in the American Journal of Science, Vol. V., 1822, of impres-

sions of human feet in sandstone, discovered many years ago in a quarry at St. Louis, on the western bank of the Mississippi river. 'The above figure is an exact copy of the original drawing, and exhibits the impressions of the soles of two corresponding human feet placed at a short distance from each other, as of an individual standing upright in an easy position. The prints are described as presenting a perfect impress of the feet and toes, exhibiting the form of the muscles and the flexures of the skin, as if an accurate cast had been taken in a soft substance. They were at first supposed to have been cut in the stone by the native Indians, but a little reflection sufficed to show that they were beyond the efforts of these rude children of nature; since they evinced a skill which even my distinguished friend, Sir Francis Chantry, could not have surpassed. No doubt exists in my mind that they are the actual prints of human feet in soft sand, which was quickly converted into solid rock by the infiltration of calcareous matter in the manner already described. The length of each foot is $10\frac{1}{2}$ inches, the spread of the toes 4 inches, indicating the usual stature; and the nature of the impression shows that the feet were unconfined by shoes or sandals. This phenomenon, unique of its kind, is fraught with so much importance that I have requested Prof. Silliman to ascertain the nature of the sandstone and the period of its formation.' "

My honored preceptor, the late David Dale Owen, soon exposed the fallacy of the hasty conclusions reached by Schoolcraft, and pointed to the fact that the slab was a limestone belonging to the palæozoic age, and was studded with brachiopod shells, characteristic of the sub-carboniferous period, and the tracks, however perfect in form, were carved into the solid rock by human hands. The most zealous advocate of man's antiquity would hardly dream of tracing him back to palæozoic times. Subsequently Dr. Owen collected

a large number of stones containing carved human feet, and from a careful study of the subject came to the conclusion that in most cases they were carved in stone, so situated, as to commemorate the highest water-mark of the streams, or to note some other memorable event.

I mention these facts to show how easy it is for one to be led astray, when every possible phase of the subject is not carefully studied. Let us, therefore, attend strictly to detailing facts of observation, and they are sure to lead to a correct solution of all problems within the compass of the human mind.

APPENDIX.

